Aalto University
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Unusual trading activity prior to merger and acquisition announcements – evidence from the United States

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Abstract

This paper investigates how unusual trading volume of stocks precede favourable/unfavourable merger or acquisition announcements. I find that the cumulative abnormal returns after the announcement are on average lower on stocks that experience unusually low or high trading volume prior to the announcement day than on normal volume stocks. My findings contradict slightly with the previous literature, which supports the idea that unusually high trading volume signals more positive future returns. The data consists of the United States stocks from 2002 to 2015. The focus is on the target stocks – i.e. the company being acquired or merged into the buying company.

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1. Introduction

"Analysing trading volume is the next revolution in financial economics." – Cochrane (2007)

Many studies have been conducted to investigate the abnormal return reaction to mergers and acquisition announcements, e.g. Borges and Gairifo (2013). Although, it should be noted that studies by e.g. Agrawal et al (1992) have shown that the abnormal returns will fade away in the years following the announcement. While the abnormal return reactions of merger and acquisition announcements have been the interest of numerous studies, the *abnormal volume* hasn't been the centre of many studies. Jansen (2015) argues that volume reactions provide another, critical and distinct insight into the contents of the announcement.

Gervais, Kaniel and Mingelgrin (2001) present a phenomenon called the high-volume return premium. They investigated the effect trading volume might have on future prices. Gervais, Kaniel and Mingelgrin (2001) found that individual stocks whose trading volume is unusually large (small) tend to experience larger (smaller) returns in the near future. They offer the main explanation for that to be the stock's *visibility.*

Miller (1977) and Mayshar (1983) claim that owners of a stock tend to be overly optimistic about its prospect. The effect seems to be even greater if there are constraints on short-selling. Also, the positive shock of trading volume is bigger than the negative shock, for which they offer a couple of explanations. Firstly, shocks that attract new investors towards a stock usually increases the price, whereas during a negative shock the potential set of sellers is restricted to the current stockholders, which results in a smaller drop in price, i.e. if there are short-selling constraints. Correspondingly, Arbel and Strebel (1982), Arbel (1985), and Merton (1987) argue that when the amount of analysts and traders increases for particular stock, its value should increase since the change reduces the estimation risk faced by other investors. Gervais, Kaniel and Mingelgrin (2001) also argue that increased trading activity affects the pool for potential investors through e.g. news, word of mouth and the Internet.

An influential article, Akbas (2016), studies the unusually low volume prior to earnings announcements which tends to predict an unfavourable earnings surprise. His findings support the view that unusually low trading volume is a signal of bad news about firm fundamentals since, under short-selling constraints, informed short sellers cannot profit on their insight. His findings further suggest that the underlying driver for the volume prompted price movements is different for unusually high volume shocks and low volume shocks.

The idea that, under short-selling constraints, unusually low trading activity is a signal of bad news is presented by Diamond and Verrecchia (1987). According to Diamond and Verrecchia (1987), "Periods of the absence of trade are bad news because they indicate an increased chance of informed traders with bad news who are constrained from selling short".

Diamond and Verrechia (1987) say that short sellers and traders with more information than rest of the market, and whose trading activity signals negative information about the fundamentals of the firm. In frictionless stock markets no short-selling constraints would exist and short sellers would be able to trade their information on the markets freely, thus reflecting all information in the stocks trading volume and price about the expectations of the asset. Nevertheless, in a market where short-selling constraints exist, the sudden lack of trading might indicate that short sellers are forced to not participate in the trading.

This paper focuses on studying the situation when unusually high or low trading volume occurs prior to merger and acquisition announcement and how it reflects the future returns of that particular stock. I focus on the sellers' side, i.e. the company being bought out or merged into the acquiring company. To my knowledge, this is the first paper to study this particular effect. I received the idea to investigate this issue from Ferhat Akbas's article The Calm Before the Storm (2016) from the Journal of Finance where the author suggested to further improve our understanding about unusual trading activity by examining unscheduled events, such as merger and acquisition announcements.

2. Previous literature and hypotheses

2.2 Unusual volume and returns

Gervais, Kaniel and Mingelgrin (2001) investigated how trading activity might conceal information about future price of the stock. They found that stocks with unusually large (small) trading activity over a day or week period tend to have larger returns the consecutive month. The essence of their findings are portrayed in figure 1 below[1]. My initial hypothesis was derived from these results: an unusually high (low) volume prior to the announcement should result in higher (lower) returns after the announcement.

[1] Gervais, Kaniel and Mingelgrin (2001). Journal of Finance 56, p. 878.

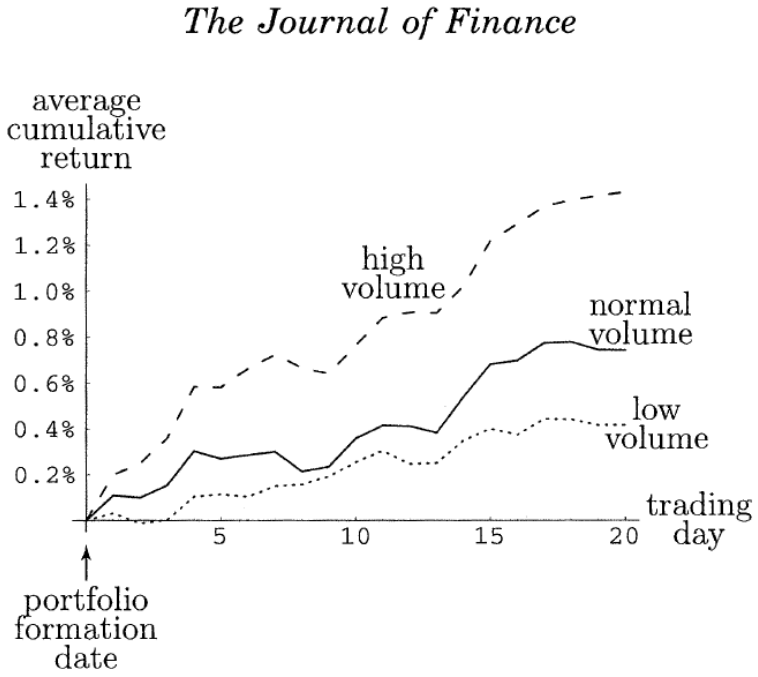

Figure 1. Evolution of the average cumulative return of stocks conditional on their one-day trading volume shocks. At the end of every 50th trading day between August 1963 and December 1996, equally weighted portfolios are formed according to the trading volume (as measured by the number of shares traded) experienced by each stock during that day. A stock whose trading volume that day is among its top (bottom) five daily trading volumes over the last 50 trading days is categorized as a "high-volume" ("low-volume") stock; otherwise, it is categorized as a "normal-volume" stock. The average cumulative return of the three portfolios is plotted in this figure.

In the article written by Gervais et al (2001) the main hypothesis was to test whether the trading volume of a stock has any information in predicting the stock's returns. According to them, the efficient market hypothesis argues that the trading volume should not have any explanation power over the future returns of a stock since all the possible information should be reflected in the price of the stock. However, this doesn't seem to be the case, as it seems there are certain agents with information that isn't reflected in the prices of stocks.

2.3 Unusual volume prior to earnings announcements

Beaver's (1968) study of earnings announcements suggest that earnings and dividend announcements are often accompanied by unusual changes in the stock's price and trading volume. Additionally, Bamber and Cheon (1995) show that earnings announcements with large trading volume but small price change tend to be ensued by price increases.

Akbas (2016) takes the investigation further by providing evidence that stocks that experience unusually low trading volume over the week before earnings announcements tend to have more unfavourable earnings surprises. He measures the unusual volume by comparing a stock's average daily turnover over the week, which he calls event period, prior to earnings announcement date and the stock's previous 10 weeks of turnover, which he calls the reference period. By this comparison he categorises the stocks to be either a) low volume b) high volume or c) normal volume stock.

The author also remarks in his article about the findings of Brennan and Subrahmanyam (1996) and Chordia, Subrahmanyam and Anshuman (2001), which state that high level of trading volume is actually *negatively related* to future returns. Instead, it is the *unusually high level* of trading volume that is positively correlated with future returns.

Akbas (2016) found an important finding in addition to his finding, that unusually low volume before the earnings announcement tend to contain negative information about the future cash flows of the stock: there is no significant relation between unusually high trading volume and earnings surprises. This finding proposes that high volume shocks do not contain positive information about firm fundamentals. Thus, the information content of low and high volume shocks differ.

2.4 Trading volume around merger and acquisition announcements

Jansen (2015) studies the abnormal volume reaction to merger and acquisition announcements. However, he doesn't investigate the causality between abnormal returns and abnormal trading volume.

Jansen (2015) found that abnormal trading volume occurs well before the announcement date. The abnormal trading volume becomes significantly positive 5 days before the announcement dates at 2.4% above the normal volume and steadily grows to almost 10% on one day before the announcement dates. Therefore, he argues, there may be informed trading taking place before the public announcement.

Moeller et al (2004) documents four characteristics prior to merger and acquisition announcements that have the biggest impact in abnormal *return* reaction: 1) firm size 2) method of payment 3) target ownership and 4) relative size. Jansen (2015) focuses on the same characteristics and finds that the biggest abnormal *volume* reactions are produced when 1) acquirer's size is small 2) method of payment is equity 3) target ownership is public and 4) relative size of the acquirer (compared to the acquisition size) is small.

2.5 Abnormal returns and merger and acquisition announcements

As stated before, the abnormal returns around merger and acquisition announcements is a known phenomenon. For instance, Keown and Pinkerton (1981) and Jensen and Ruback (1983) study the

wealth effects on mergers and acquisitions in the U.S. and conclude, that targets clearly gain abnormal returns. Also, Franks and Harris (1989) investigate the effects of U.K. takeovers on shareholder wealth and as well find that target firms' shareholders gain abnormal returns.

Hackbarth and Morellec (2008) provide a real options framework to analyse stock returns in mergers and acquisitions. Their sample consists of 1,086 takeovers of publicly traded U.S. firms between 1985 and 2002. Their investigation shows that the 3-day (1 day prior to and 1 day after announcements) cumulative abnormal return (CAR) is 18.21% for the target firms' stocks. Their findings are presented in figure 2 below. The main driver for the anomaly seems to be that the acquirers tend to pay premium for the target's stock, so that the shareholders would be willing to sell the rest of the shares, which results in higher share prices, and thus abnormally high returns.

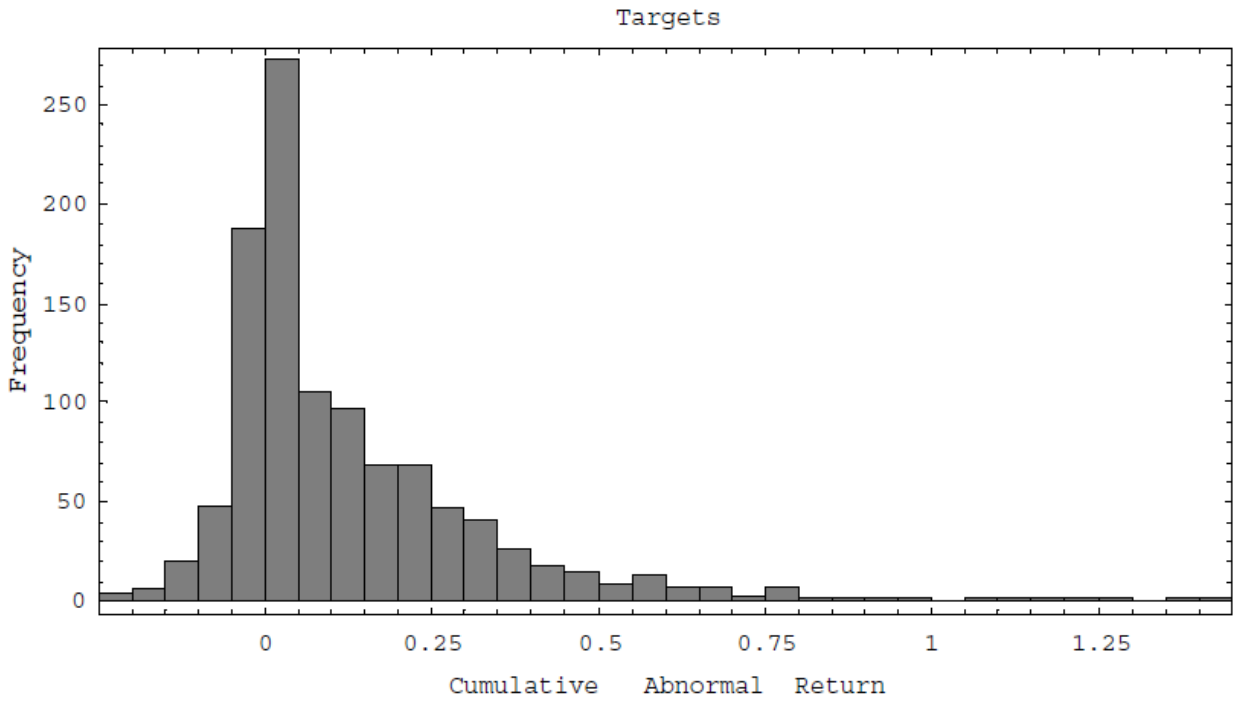

Figure 2. Announcement returns for target. Findings by Hackbarth and Morellec (2008).

2.6 Hypotheses

My main hypothesis focuses on the case where unusually low trading volume occurs before the announcement date on the target firm's stock. The hypothesis derives from the following idea: when informed traders are aware of a slightly negative merger or acquisition announcement in the near future (i.e. for instance a takeover that will result in a bad outcome for the shareholders of the target) and short-selling constraints exist, they are kept from trading their information, thus leading to lower trading volumes. Therefore, there should be a distinct difference in cumulative abnormal returns between the unusually low volume trading stocks and normal volume stocks.

In addition to this, my secondary hypothesis focuses on the high volume trading stocks. My findings should be similar to Akbas' (2016), and thus the information content between high and low trading stocks are different and the high volume does not correlate with higher returns. Although, Gervais et al (2001) argues that the high volume trading stocks will have high returns, which is also possible.

3. Data and methodology

3.1 Data

The data used in this study consists of public U.S. merger and acquisition *target* stocks from 2002 to 2015. The data considering the mergers and acquisitions was taken from Securities Data Company's (SDC) databases. All information regarding the returns, volumes, prices and shares outstanding were acquired from Wharton Research Data Services (WRDS).

The data sample consists of 2,790 individual mergers or acquisitions. All announcements, which resulted in the acquirer gaining over 50% ownership in the target firm were left in the data. If information regarding trading volume, return on shares, M&A announcement date or shares outstanding were not found, the transaction was left out of the investigation's scope. Share data that was missing trading days or couldn't be combined with other databases due to missing identification data was left out, as well.

Overview of the data	
N (all)	2,805
N (no micro cap firms)	1,304
Amount of returns (all)	156,823
Amount of returns (no micro cap)	73,219
Average CAPM beta (all)	0.64
Average CAPM beta (no micro cap)	0.85
Median market value (all)	$291M

Table 1. Overview of the data

3.2 Methodology

The study follows loosely the method provided by Gervais et al (2001), where stocks are classified as low, normal or high volume stocks with dummy variables by comparing reference and event period volumes of each individual stock. The announcement date of a merger or acquisition is stated as day 0. *Event period* is a 7-day long period before the announcement date, [-8,-2]. *Reference period*

is defined to be [-50,-10[, i.e. 40 days prior to the event period. Cumulative abnormal average returns (CAAR) are calculated for [-1,30]. CAARs were calculated for each day to compare whether unusually high (low) volume stocks differ return-wise from normal volume stocks.

Average shares outstanding for any share i for the period was calculated as follows:

$$Average\ SHROUT_{i,t} = \frac{\sum_{-50}^{30} SHROUT_{i,t}}{N_{i,[-50,30]}}$$

where

$SHROUT_{i,t}$ is the amount of shares outstanding for share i at time t

t is the days till the event day

N stands for the amount of trading days used in the calculations.

Therefore, the average shares outstanding was calculated for the whole period of the study, i.e. [-50,30].

Turnover for stock i in a given day j is calculated as follows:

$$Turnover_{i,j} = \frac{Volume_{i,j}}{Average\ SHROUT_{i}}$$

where

$Volume_{i,j}$ is the trading volume taken from WRDS measured in thousands.

Average turnover for the stock i in the period [j,k] is calculated as follows:

$$Average\ turnover_{i}\ [j,k] = \frac{\sum_{j}^{k} Turnover_{i,j}}{N_{i,[j,k]}}$$

where

$N_{i,[j,k]}$ is the amount of trading days for stock i.

Next, each stock was classified as a) low volume, b) normal volume or c) high volume share. The average turnover during the event period was compared to the average turnover during the reference period.

Whether or not the stock i is classified as unusually low volume stock, the following formula is used:

$$\frac{Average\ turnover_i\ [-8,-2]}{Average\ turnover_i\ [-50,-10[} \leq (100\% - x)$$

where x was used to determine the magnitude of difference between low and high volume shares.

To classify stock i as high volume stock, the formula is as follows:

$$\frac{Average\ turnover_i\ [-8,-2]}{Average\ turnover_i\ [-50,-10[} \geq (100\% + x)$$

Therefore, for the stock i to be classified as a low (high) volume stock, its average event period turnover has to be x smaller (bigger) than the average reference period turnover. Stocks that aren't classified as low or high volume stocks are automatically classified as normal volume stocks. Bigger the x, bigger the size of the normal volume stock sample.

As a robustness check, different x's were used to check whether the results abide.

Return for any share i for any given day j is calculated the following way:

$$RET_{i,j} = \frac{PRC_{i,j} - PRC_{i,j-1}}{PRC_{i,j-1}}$$

where

$PRC_{i,j}$ is the stock i's return on day j.

Betas were calculated for each stock i following way:

$$\beta_i = \frac{cov(RET_i, RET_M)}{{\sigma_M}^2}$$

where

RET_M is the return of the S&P 500 (i.e. the market portfolio in this study)

${\sigma_M}^2$ is the variance of the return of the market portfolio

$cov(RET_i, RET_M)$ is the covariance between the return of the market and the return of the asset

The individual betas were calculated in the period [-150,-50] with respect to the announcement day.

Expected return is calculated as follows (capital asset pricing model):

$$E(RET_i) = RET_f + \beta_i * (RET_M - RET_f)$$

where

RET_f is the risk free rate

As risk-free rate 1.3%[2] was used, i.e. U.S. 3-month T-Bill average during the whole period.

Next I calculated the abnormal returns for each stock i the following way:

$$Abnormal\ return_i = RET_i - E(RET_i)$$

Then cumulative abnormal returns (CAR) for stock i for any given period [j,k] was computed the following way:

$$CAR_{i,[j,k]} = \sum_{j}^{k} RET_{i,j}$$

Finally, average CAR was calculated for 1) low volume stocks 2) normal volume stocks and 3) high volume stocks with the formulas provided.

As mentioned before, different x's were used to see if the results stay the same. This means the criteria for choosing the three different types of stocks varies to make sure the results aren't due to selection bias. Also, Welch two sample t-tests for mean differences were conducted to see whether the results are statistically significant. In addition to this, the calculations above were done without the micro-cap firms whose average market value in the reference period is less than 300M.

Amount of firms in each group, all firms			
x	25 %	50 %	75 %
Dummy_LOW	989	398	96
Dummy_HIGH	891	627	474

Table 2. Amount of firms in each group with different x's, all firms.

[2] http://people.stern.nyu.edu/adamodar/New_Home_Page/data.html

Amount of firms in each group, no micro cap		
x	25 %	50 %
Dummy_LOW	355	70
Dummy_HIGH	398	267

Table 3. Amount of firms in each group with different x's, no micro cap firms.

4. Results, robustness checks and interpretation

4.1 Main findings

The main findings may be found in figures 3, 4 and 5 below. The x-axis shows the number of days, where day 0 is the event day, i.e. the day of the merger or acquisition announcement. The y-axis shows the cumulative abnormal average return (CAAR). In the caption of the charts is described what x was used in the calculations of CAAR. Higher the x, higher the difference between volumes on stocks classified as normal and unusual.

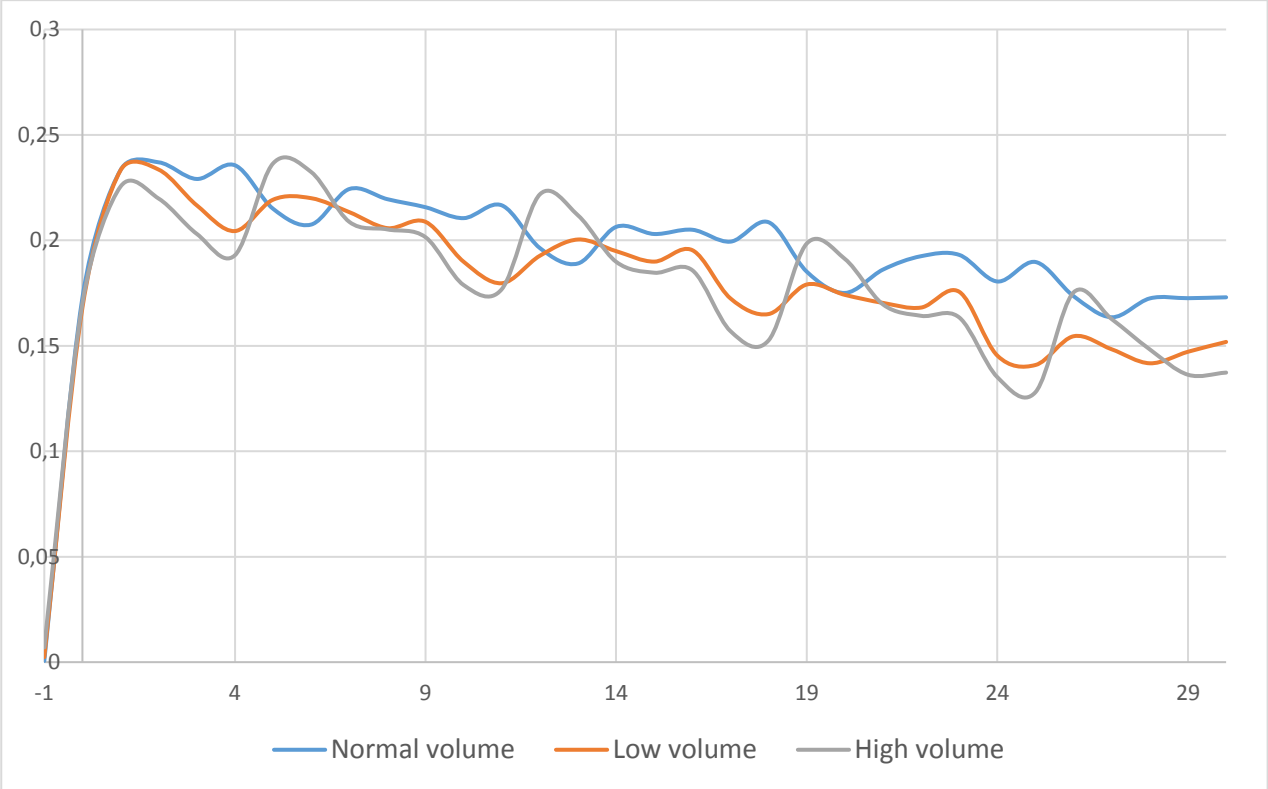

Figure 3. CAAR [-1, 30], where x = 25%.

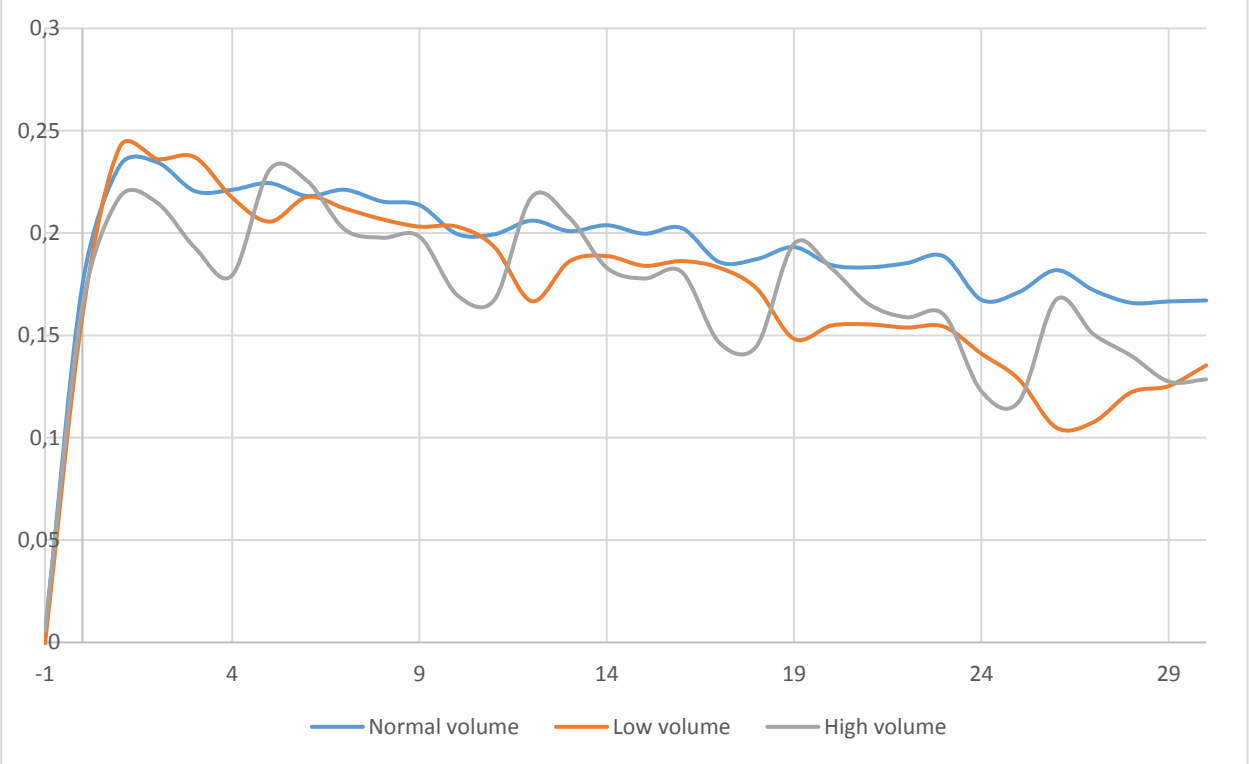

Figure 4. CAAR [-1, 30], where x = 50%

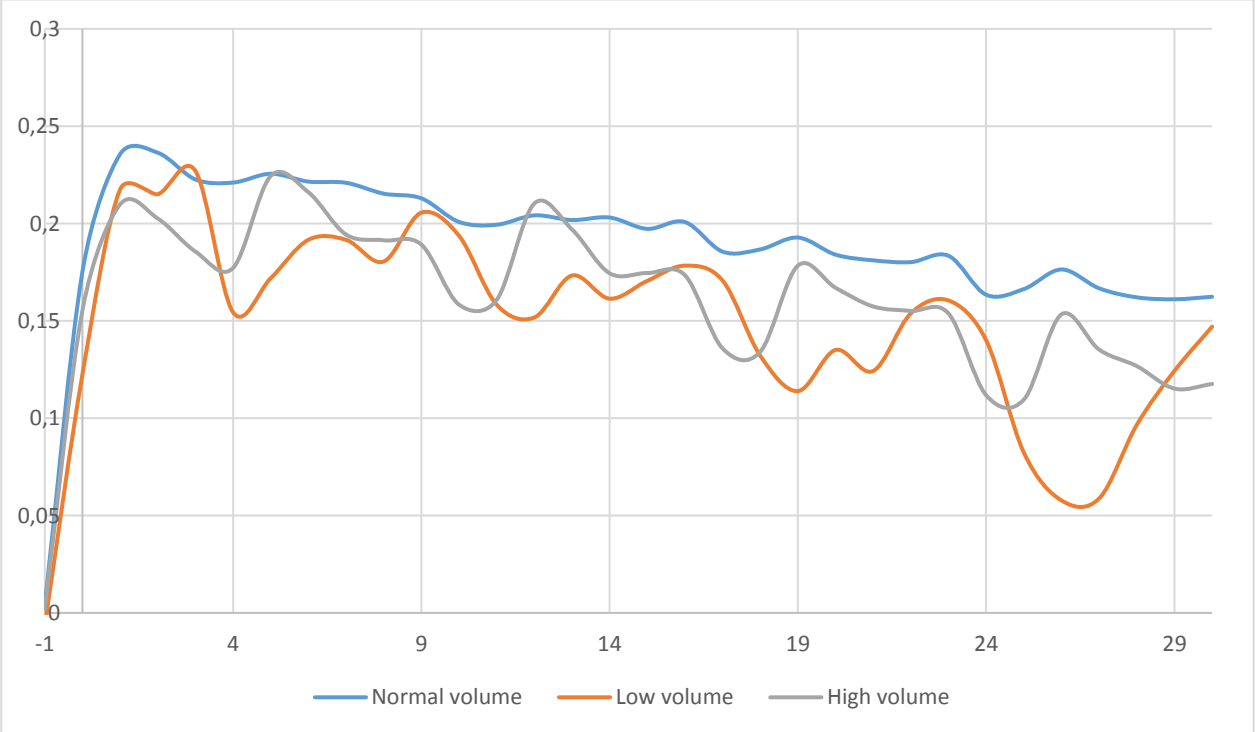

Figure 5. CAAR [-1, 30], where x = 75%

Two major findings may be seen from the figures above: 1) as Hackbarth and Morellec (2008) have shown, the cumulative abnormal average return is significantly positive for target firms during the period [-1, 1], which is mostly explained by the premium the buyer has to pay. The graphs show that the CAAR has a clear downwards trend after that. These findings are in line with the findings of e.g. Jensen and Ruback (1983). 2) Stocks that are classified to have an unusual trading volume prior to the announcement experience most of the time lower cumulative abnormal average returns than the normal return stocks.

My initial hypothesis was that stocks classified as unusually low volume should have lower returns than normal volume stocks. That hypothesis appears to be true according to the data. My second hypothesis revolved around the high volume stocks. It appears that unusually high volume does not precede higher abnormal returns than normal volume stocks. As Akbas (2016) argued, the information content is different between the normal, high and low volume stocks. Thus, I accept both hypotheses with some uncertainty. T-tests are shown in the next section.

4.2 Two sample t-tests

I conducted individual Welch two sample t-tests for each of the calculations in figures 3, 4 and 5. The results are shown below in tables 1 and 2. The values in the tables are p-values testing whether the means of the two individual groups differ significantly each day during the CAAR period [-1, 30].

Low vs normal tests whether unusually low volume stocks' CAARs differ significantly from normal trading volume CAARs. High vs normal tests whether unusually high volume stocks' CAARs are notably different from normal volume stocks' CAARs. Low vs high is a test whether the two groups differ significantly from each other in terms of CAAR. *Light green* values mean the results are significant at *5% level*, i.e. the p-value is smaller than 0.05. *Dark green* indicates the result is significant at *1% level*.

The most important notes from these t-tests are: 1) most of the results where unusual volume CAARs are compared to normal volume CAARs are statistically significant or very significant when x = 25% or x = 50%. 2) The results at x = 75% mostly aren't statistically significant. The sample size of the unusual volume stocks is too small. 3) Unusually high and low volume stocks don't generally have statistically significant difference between them.

	x = 25%			x = 50%		
Days	**Low vs normal**	**High vs normal**	**Low vs high**	**Low vs normal**	**High vs normal**	**Low vs high**
-1	0.9819	0.4984	0.5717	0.2329	0.7608	0.1692
0	0.5716	0.0068	0.0375	0.3596	0.0297	0.4507
1	0.0028	0.0008	0.8369	0.0041	0.0091	0.4574
2	0.3012	0.5441	0.5431	0.0494	0.6951	0.0840
3	0.0297	0.3143	0.1467	0.0057	0.2718	0.0371
4	0.0023	0.0019	0.9168	0.0296	0.0083	0.9995
5	0.1179	0.0234	0.5184	0.1130	0.0265	0.8237
6	0.0004	0.0000	0.6043	0.0013	0.0004	0.4698
7	0.7368	0.0875	0.0573	0.8843	0.1658	0.2903
8	0.0139	0.0000	0.1949	0.0013	0.0001	0.6197
9	0.0348	0.7087	0.0525	0.0042	0.9785	0.0038
10	0.0287	0.2557	0.1771	0.0638	0.4115	0.1864
11	0.0009	0.0008	0.9112	0.0123	0.0040	0.9519
12	0.0138	0.0541	0.5299	0.0311	0.0920	0.3917
13	0.0027	0.0002	0.7501	0.0906	0.0074	0.8021
14	0.5058	0.0616	0.0194	0.8318	0.0413	0.2683
15	0.0115	0.0001	0.5328	0.0028	0.0009	0.4090
16	0.0980	0.5289	0.2399	0.0084	0.6968	0.0202
17	0.0036	0.0151	0.3145	0.1198	0.0961	0.6673
18	0.0002	0.0000	0.8585	0.0037	0.0003	0.8659
19	0.0536	0.1749	0.5091	0.0298	0.1952	0.2331
20	0.0019	0.0151	0.1871	0.0535	0.1233	0.3978
21	0.1925	0.2415	0.0172	0.5082	0.2237	0.1508
22	0.0142	0.0001	0.5429	0.0091	0.0015	0.5623
23	0.0082	0.8558	0.0121	0.0007	0.9599	0.0011
24	0.0111	0.1221	0.1730	0.0684	0.2962	0.2621
25	0.0001	0.0000	0.6491	0.0076	0.0000	0.4992
26	0.0205	0.3304	0.1850	0.0262	0.4553	0.1190
27	0.0001	0.0003	0.1253	0.0279	0.0219	0.4247
28	0.1434	0.0740	0.0022	0.3123	0.1079	0.0409
29	0.0329	0.0013	0.6588	0.0121	0.0043	0.5066
30	0.0143	0.9025	0.0098	0.0014	0.7951	0.0010

Table 4. Welch Two Sample t-test p-values, x=25% and 50%.

		x = 75%		
Days		**Low vs normal**	**High vs normal**	**Low vs high**
	-1	0.0406	0.5857	0.0279
	0	0.0083	0.7745	0.0253
	1	0.2602	0.9964	0.3348
	2	0.2682	0.1538	0.1012
	3	0.9517	0.8785	0.9701
	4	0.3472	0.0171	0.4970
	5	0.4809	0.5963	0.7797
	6	0.5892	0.6132	0.4214
	7	0.0000	0.3749	0.0000
	8	0.4574	0.4215	0.2538
	9	0.0642	0.2629	0.0255
	10	0.5982	0.7148	0.4767
	11	0.0755	0.0377	0.7979
	12	0.6740	0.7993	0.8351
	13	0.3658	0.5703	0.2421
	14	0.0000	0.4828	0.0000
	15	0.4645	0.4903	0.2951
	16	0.1096	0.1728	0.0375
	17	0.3697	0.6769	0.2841
	18	0.2054	0.0051	0.6027
	19	0.6152	0.2720	0.8176
	20	0.4896	0.6105	0.7124
	21	0.0000	0.2467	0.0000
	22	0.5550	0.5894	0.4118
	23	0.0466	0.1300	0.0118
	24	0.1854	0.6086	0.3494
	25	0.1617	0.0015	0.5732
	26	0.9565	0.5938	0.6853
	27	0.4879	0.6859	0.3887
	28	0.0000	0.8908	0.0000
	29	0.5033	0.7603	0.4383
	30	0.0893	0.1144	0.0232

Table 5. Welch Two Sample t-test p-values, x=75%.

4.3 Micro-cap stocks omitted

I also calculated the cumulative abnormal average returns without micro-cap stocks, i.e. firms whose market value is less than $300M. The results look similar to the previous results that include all firms with an even bigger difference between the unusual volume and normal volume CAARs. The results are shown in figure 6.

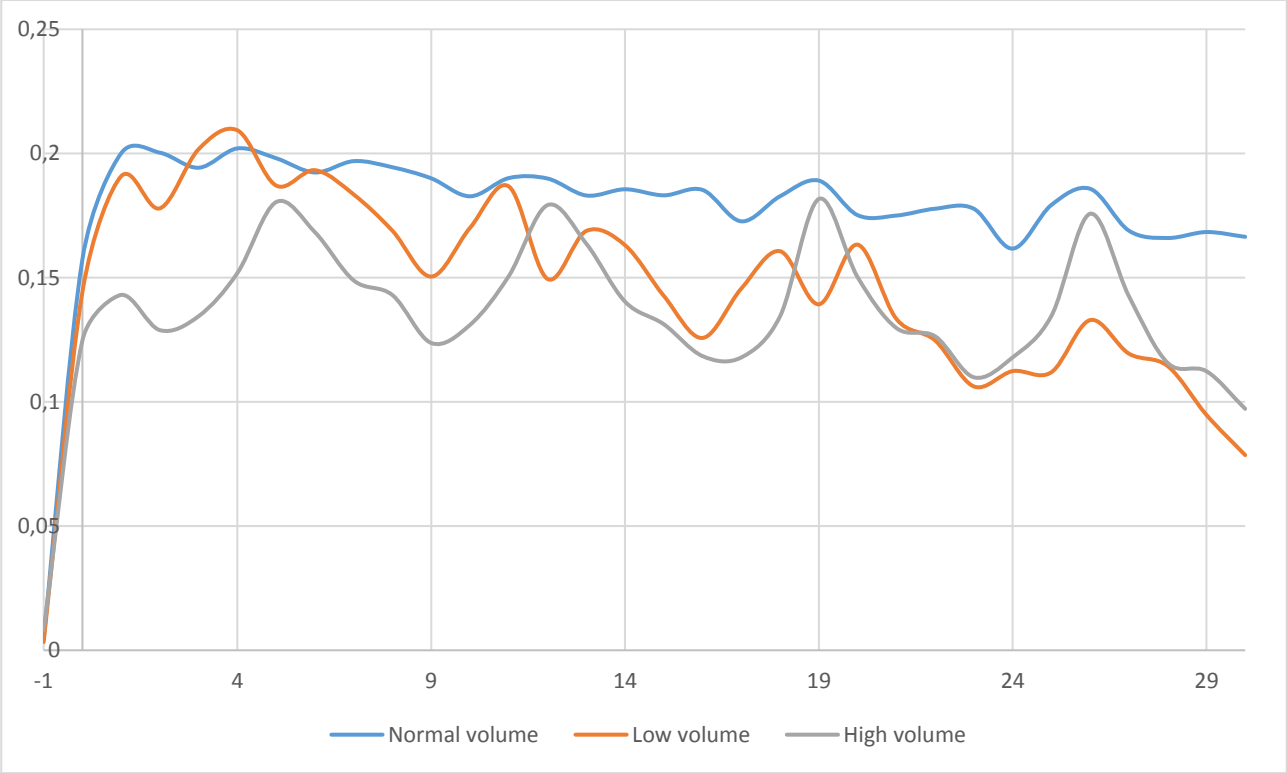

Figure 6. CAAR [-1, 30], where x = 50% and micro-cap firms are omitted from the sample.

4.4 Interpretation of the results

The results seem to point out that the volume of target stocks holds important information regarding an upcoming merger or acquisition. Both unusually low and high volume before the announcement precede lower cumulative abnormal returns than the normal volume stocks experience.

Explanation for the unusually low volume returns could be the one provided by Akbas (2016) for earnings surprises – under short-selling constraints, informed agents are unable to sell their stock before the announcement. Although, the explanation probably isn't the same, since all of the three stock groups provide significant abnormal returns. Therefore, if any agent was well informed and could predict the upcoming M&A announcement, she should be stacking on the stock, regardless of

whether it would be a great announcement or a decent one – either way the targets' stockholders earn abnormal returns.

One possible explanation could be that the stocks experiencing low trading volume are the ones with negative predictions of the firm fundamentals, as shown by e.g. Diamond and Verrechia (1987), which ultimately allows the acquirer to pay smaller price for the target firm. The bid has a big impact in the near-future price of the target firm, thus making the CAAR smaller on unusually low volume firms. Therefore, the unusually low volume isn't wholly because of the upcoming merger or acquisition announcement, but because informed traders know the firm isn't well suited for making great cash flows, thus making them not interested in buying the stock, and under short-selling constraints, unable to sell them. This study isn't comprehensive enough to be certain what the explanation is and I will leave the closer inspections to future investigations.

Unusually high-volume stocks experiencing lower CAAR after the announcement could be explained by informed traders buying the stock well before the announcement, thus making the price on the announcement date higher which in essence makes the relative return smaller. The returns before day -1 could therefore be higher on high volume stocks than on normal trading stocks, which makes the CAAR for the period [-1, 30] smaller, although the returns, for instance, for period [-50, 30] could be higher for high volume stocks than normal volume stocks.

Also, as Chordia, Subrahmanyam and Anshuman (2001) found out, stocks with high trading volume actually experience lower returns. They argue that the reasons for this is high liquidity, which essentially makes the stock less risky, thus lowering the expected return. They argue that high trading volume is a decent proxy for measuring liquidity. Therefore, the lower cumulative abnormal returns might not have anything to do with the announcement, but rather other characteristics.

5. Conclusions and suggestions for further research

In this paper I investigate the information content of unusually high (low) trading volume about upcoming merger or acquisition announcement. I focused entirely on the target side. I find that the normal volume stocks have higher cumulative abnormal returns after the announcement dates than the ones experiencing unusual trading volume prior to the announcements of merger or acquisition.

This paper contributes to the ongoing research on trading volumes and what information it contains that the prices of the stocks don't. Unlike previous literature, I focus on the unusual volumes preceding merger and acquisition announcements. To my knowledge, no similar study has been conducted before. CAAR after the announcement should contain some information on the size of the bid – whether it was considered high or not by the stockholders of the target or compared to the intrinsic value. Thus, normal volume stocks should experience the most positive price shock in the event of M&A announcement.

In this paper I focused on finding if there is correlation between the unusual volume and the returns merger and acquisition announcements. Our knowledge could be further improved by broadening the scope of the investigation. For instance, an extension to this study could be conducted by

investigating the *bidder firms*, i.e. the buying firms. Also, the rationale and mechanisms between the difference in returns of normal and unusual trading volume stocks should be further investigated. For instance, a study could be conducted with different event and reference periods and different market areas, e.g. Europe. Also, the cumulative abnormal average returns could be calculated for many different time frames to truly see the whole picture.

In addition to these recommendations, more studies could be conducted based loosely on the same methodology; unusual trading volume could be investigated before other surprises, e.g. changes in the firm's management, big changes in the strategy or to predict whether the firm will go bankrupt in the near future. The volumes of stocks seem to hold important information about the fundamentals of the firms and remains an interesting area of study in the future.

6. References

Agrawal, Anup and Jaffe, J., Mandelker, G., 1992, The Post-Merger Performance of Acquiring Firms: A Re-examination of an Anomaly, The Journal of Finance 47 4 1540-6261.

Akbar, Ferhat, 2016. Calm before the storm, The Journal of Finance 71, 225-266.

Arbel, Avner, 1985, Generic stocks: An old product in a new package, Journal of Portfolio Management 11, 4-13.

Arbel, Avner and Strebel, P., 1982, The neglected and small firm effects, Financial Review 17, 201-218.

Borges, Maria and Gairifo Ricardo, 2013, Abnormal returns before acquisition announcements: evidence from Europe, Applied Economics, 45:26, 3723-3732, DOI: 10.1080/00036846.2012.730134.

Brennan, Michael J. and Subrahmanyam, A., 1996, Market microstructure and asset pricing: On the compensation for illiquidity in stock returns, Journal of Financial Economics 41, 441–464.

Chordia, Tarun and Subrahmanyam, A., and Anshuman, V., 2001, Trading activity and expected stock returns, Journal of Financial Economics 59, 3–32.

Cochrane, John, 2007, Efficient markets today, in Presentation at Conference of Chicago Economics. Accessed 1 December 2016 at: *http://faculty.chicagobooth.edu/john.cochrane/research/Papers/Cochrane_efficient_markets.doc*.

Franks, Julian and Harris, R., 1989, Shareholder wealth effects of corporate takeovers, Journal of Financial Economics, 23, 225–49.

Gervais, Simon and Kaniel R., and Mingelgrin D., 2001. The high-volume return premium, Journal of Finance 56, 877–919.

Hackbarth, Dick and Morellec, E., 2008, Stock Returns in Mergers and Acquisitions and journal of finance vol LXIII, No 3, 1213-1252.

Jansen, Ivo, 2015, Trading volume around announcements of mergers and acquisitions, Applied Economics Letters Vol. 22, No. 15, 1204–1208.

Jensen, Michael C. and Ruback, R., 1983, The market for corporate control: The scientific evidence, Journal of Financial Economics 11, 5-50.

Mayshar, Joram, 1983, On divergence of opinion and imperfections in capital markets, American Economic Review 73, 114-128.

Miller, Edward M., 1977, Risk, uncertainty, and divergence of opinion, Journal of Finance 32, 1151-1168.

Moeller, Sara and Schlingemann, F. P. and Stulz, R. M., 2004, Firm size and the gains from acquisitions, Journal of Financial Economics, 73, 201–228.

7. Appendices

Appendix 1: Overview of the returns when x=25%.

Event days	CAAR, all	CAAR, normal volume	CAAR, low volume	CAAR, high volume	Average AR (all)	avg AR LOW	avg AR HIGH
-1	0.3 %	0.1 %	0.2 %	0.7 %	0.3 %	0.2 %	0.7 %
0	17.0 %	17.3 %	16.8 %	17.0 %	16.8 %	16.7 %	16.6 %
1	23.1 %	23.3 %	23.3 %	22.6 %	6.6 %	6.9 %	5.9 %
2	23.1 %	23.7 %	23.4 %	22.0 %	0.0 %	0.1 %	-0.2 %
3	21.7 %	22.9 %	21.7 %	20.3 %	0.6 %	0.4 %	0.8 %
4	21.1 %	23.6 %	20.4 %	19.3 %	-0.4 %	-0.5 %	-0.5 %
5	22.3 %	21.5 %	21.9 %	23.6 %	-0.5 %	-1.0 %	-0.1 %
6	22.0 %	20.7 %	22.0 %	23.2 %	-0.5 %	-0.6 %	-0.7 %
7	21.6 %	22.4 %	21.3 %	20.9 %	-0.4 %	-0.4 %	-0.5 %
8	21.0 %	22.0 %	20.6 %	20.5 %	-0.4 %	-0.5 %	-0.4 %
9	20.9 %	21.6 %	20.9 %	20.1 %	-0.5 %	-0.6 %	-0.5 %
10	19.4 %	21.1 %	19.0 %	17.9 %	-0.5 %	-0.7 %	-0.5 %
11	19.1 %	21.7 %	18.0 %	17.7 %	-0.5 %	-0.6 %	-0.5 %
12	20.3 %	19.6 %	19.3 %	22.2 %	-0.5 %	-0.8 %	-0.4 %
13	20.0 %	18.9 %	20.0 %	21.2 %	-0.6 %	-0.6 %	-0.7 %
14	19.7 %	20.6 %	19.5 %	19.0 %	-0.5 %	-0.6 %	-0.4 %
15	19.3 %	20.3 %	19.0 %	18.5 %	-0.4 %	-0.5 %	-0.3 %
16	19.6 %	20.5 %	19.5 %	18.6 %	-0.3 %	-0.3 %	-0.4 %
17	17.7 %	19.9 %	17.2 %	15.7 %	-0.5 %	-0.5 %	-0.6 %
18	17.5 %	20.9 %	16.5 %	15.3 %	-0.4 %	-0.4 %	-0.4 %
19	18.7 %	18.5 %	17.9 %	19.8 %	-0.6 %	-0.7 %	-0.6 %
20	18.0 %	17.5 %	17.4 %	19.1 %	-0.5 %	-0.6 %	-0.5 %
21	17.5 %	18.6 %	17.0 %	17.0 %	-0.4 %	-0.4 %	-0.5 %
22	17.5 %	19.2 %	16.8 %	16.4 %	-0.4 %	-0.5 %	-0.5 %
23	17.8 %	19.3 %	17.6 %	16.3 %	-0.4 %	-0.4 %	-0.6 %
24	15.4 %	18.0 %	14.5 %	13.5 %	-0.6 %	-0.7 %	-0.4 %
25	15.3 %	19.0 %	14.1 %	12.8 %	-0.4 %	-0.5 %	-0.4 %
26	16.7 %	17.4 %	15.5 %	17.5 %	-0.3 %	-0.3 %	-0.3 %
27	15.8 %	16.4 %	14.8 %	16.3 %	-0.4 %	-0.5 %	-0.5 %
28	15.4 %	17.2 %	14.2 %	14.8 %	-0.5 %	-0.5 %	-0.5 %
29	15.3 %	17.3 %	14.7 %	13.6 %	-0.5 %	-0.5 %	-0.5 %
30	15.5 %	17.3 %	15.2 %	13.7 %	-0.4 %	-0.5 %	-0.5 %

Appendix 2: Overview of the returns when x=50%.

Event days	CAAR, all	CAAR, normal volume	CAAR, low volume	CAAR, high volume	Average AR (all)	avg AR LOW	avg AR HIGH
-1	0.3 %	0.3 %	-0.1 %	0.6 %	0.3 %	-0.1 %	0.6 %
0	17.0 %	17.5 %	16.0 %	16.4 %	16.8 %	16.1 %	16.1 %
1	23.1 %	23.3 %	24.2 %	21.8 %	6.6 %	8.7 %	5.8 %
2	23.1 %	23.5 %	23.6 %	21.5 %	0.0 %	-0.5 %	-0.1 %
3	21.7 %	22.1 %	23.7 %	19.3 %	0.6 %	0.4 %	0.7 %
4	21.1 %	22.1 %	21.7 %	17.9 %	-0.4 %	-0.7 %	-0.7 %
5	22.3 %	22.4 %	20.6 %	23.1 %	-0.5 %	-1.1 %	0.0 %
6	22.0 %	21.8 %	21.8 %	22.5 %	-0.5 %	-0.7 %	-0.7 %
7	21.6 %	22.1 %	21.2 %	20.2 %	-0.4 %	-0.7 %	-0.4 %
8	21.0 %	21.5 %	20.7 %	19.8 %	-0.4 %	-0.6 %	-0.4 %
9	20.9 %	21.4 %	20.3 %	19.8 %	-0.5 %	-0.8 %	-0.6 %
10	19.4 %	20.0 %	20.3 %	17.0 %	-0.5 %	-0.7 %	-0.5 %
11	19.1 %	19.9 %	19.3 %	16.7 %	-0.5 %	-1.0 %	-0.5 %
12	20.3 %	20.6 %	16.7 %	21.8 %	-0.5 %	-1.1 %	-0.4 %
13	20.0 %	20.1 %	18.6 %	20.8 %	-0.6 %	-0.8 %	-0.7 %
14	19.7 %	20.4 %	18.9 %	18.3 %	-0.5 %	-0.9 %	-0.5 %
15	19.3 %	20.0 %	18.4 %	17.8 %	-0.4 %	-0.5 %	-0.4 %
16	19.6 %	20.2 %	18.6 %	18.1 %	-0.3 %	-0.3 %	-0.4 %
17	17.7 %	18.6 %	18.3 %	14.7 %	-0.5 %	-0.8 %	-0.6 %
18	17.5 %	18.7 %	17.3 %	14.5 %	-0.4 %	-0.5 %	-0.3 %
19	18.7 %	19.3 %	14.8 %	19.5 %	-0.6 %	-1.0 %	-0.6 %
20	18.0 %	18.4 %	15.5 %	18.3 %	-0.5 %	-0.8 %	-0.7 %
21	17.5 %	18.3 %	15.5 %	16.5 %	-0.4 %	-0.5 %	-0.5 %
22	17.5 %	18.5 %	15.4 %	15.9 %	-0.4 %	-0.8 %	-0.5 %
23	17.8 %	18.9 %	15.4 %	16.0 %	-0.4 %	-0.6 %	-0.6 %
24	15.4 %	16.7 %	14.1 %	12.3 %	-0.6 %	-1.1 %	-0.5 %
25	15.3 %	17.1 %	12.9 %	11.8 %	-0.4 %	-0.7 %	-0.6 %
26	16.7 %	18.2 %	10.5 %	16.7 %	-0.3 %	-0.6 %	-0.3 %
27	15.8 %	17.2 %	10.8 %	15.0 %	-0.4 %	-0.6 %	-0.6 %
28	15.4 %	16.6 %	12.2 %	14.0 %	-0.5 %	-0.5 %	-0.4 %
29	15.3 %	16.7 %	12.5 %	12.7 %	-0.5 %	-0.8 %	-0.6 %
30	15.5 %	16.7 %	13.5 %	12.9 %	-0.4 %	-0.6 %	-0.6 %

Appendix 3: Overview of the returns when x=75%.

Event days	CAAR, all	CAAR, normal volume	CAAR, low volume	CAAR, high volume	Average AR (all)	avg AR LOW	avg AR HIGH
-1	0.3 %	0.4 %	-0.6 %	0.2 %	0.3 %	-0.6 %	0.2 %
0	17.0 %	17.5 %	12.2 %	15.5 %	16.8 %	13.0 %	15.4 %
1	23.1 %	23.6 %	21.7 %	21.0 %	6.6 %	9.9 %	6.1 %
2	23.1 %	23.6 %	21.5 %	20.3 %	0.0 %	0.5 %	-0.1 %
3	21.7 %	22.3 %	22.7 %	18.6 %	0.6 %	2.2 %	0.5 %
4	21.1 %	22.1 %	15.4 %	17.7 %	-0.4 %	-1.9 %	-0.6 %
5	22.3 %	22.6 %	17.2 %	22.4 %	-0.5 %	-1.7 %	0.1 %
6	22.0 %	22.2 %	19.2 %	21.6 %	-0.5 %	-1.0 %	-0.8 %
7	21.6 %	22.1 %	19.2 %	19.4 %	-0.4 %	-0.1 %	-0.5 %
8	21.0 %	21.5 %	18.1 %	19.1 %	-0.4 %	-1.2 %	-0.4 %
9	20.9 %	21.3 %	20.6 %	18.9 %	-0.5 %	-1.3 %	-0.7 %
10	19.4 %	20.1 %	19.4 %	15.8 %	-0.5 %	-0.7 %	-0.5 %
11	19.1 %	19.9 %	15.8 %	16.1 %	-0.5 %	-1.0 %	-0.6 %
12	20.3 %	20.4 %	15.2 %	21.0 %	-0.5 %	-1.2 %	-0.3 %
13	20.0 %	20.2 %	17.3 %	19.7 %	-0.6 %	-1.0 %	-0.8 %
14	19.7 %	20.3 %	16.1 %	17.4 %	-0.5 %	-1.3 %	-0.5 %
15	19.3 %	19.7 %	17.1 %	17.5 %	-0.4 %	-0.6 %	-0.4 %
16	19.6 %	20.1 %	17.8 %	17.3 %	-0.3 %	-0.1 %	-0.4 %
17	17.7 %	18.6 %	17.1 %	13.6 %	-0.5 %	-0.8 %	-0.5 %
18	17.5 %	18.7 %	13.2 %	13.4 %	-0.4 %	-0.3 %	-0.4 %
19	18.7 %	19.3 %	11.4 %	17.8 %	-0.6 %	-1.1 %	-0.6 %
20	18.0 %	18.4 %	13.5 %	16.7 %	-0.5 %	-1.2 %	-0.7 %
21	17.5 %	18.1 %	12.4 %	15.7 %	-0.4 %	-0.8 %	-0.3 %
22	17.5 %	18.0 %	15.4 %	15.5 %	-0.4 %	-0.6 %	-0.6 %
23	17.8 %	18.3 %	16.1 %	15.4 %	-0.4 %	0.2 %	-0.5 %
24	15.4 %	16.3 %	14.0 %	11.2 %	-0.6 %	-1.0 %	-0.5 %
25	15.3 %	16.6 %	8.2 %	11.0 %	-0.4 %	-1.3 %	-0.5 %
26	16.7 %	17.6 %	5.8 %	15.3 %	-0.3 %	-0.6 %	-0.6 %
27	15.8 %	16.7 %	5.9 %	13.5 %	-0.4 %	-0.7 %	-0.9 %
28	15.4 %	16.2 %	9.7 %	12.7 %	-0.5 %	-0.6 %	-0.5 %
29	15.3 %	16.1 %	12.4 %	11.5 %	-0.5 %	-1.3 %	-0.7 %
30	15.5 %	16.2 %	14.7 %	11.8 %	-0.4 %	-0.5 %	-0.6 %

Johdon tiivistelmä (kypsyysnäyte)

Epätavallisen vaihtovolyymin vaikutus ostokohteena olevan osakkeen epänormaaleihin tuottoihin ostoilmoituksen jälkeisenä aikana – tuloksia Yhdysvalloista

Tutkin kandidaatintutkielmassani kuinka epätavallinen vaihtovolyymi korreloi osakkeen tuottojen kanssa tilanteessa, jossa kyseinen yritys päätyy ostoilmoituksen kohteeksi. Vaihtovolyymin on väitetty olevan seuraava suuri tutkimuskysymys ja läpimurtojen osa-alue modernissa rahoitustutkimuksessa. Näin väittää muun muassa arvostettu ekonomisti John H. Cochrane luennollaan vuonna 2007.

Tutkielmani johtopäätös on seuraava: yritykset, joiden osakkeet kokevat normaalia suurempaa tai normaalia pienempää vaihtovolyymia viikkoa ennen ostokaupan julkistamista on pienemmät epänormaalit tuotot julkistamista seuraavan 30 päivän aikana kuin tavallista vaihtovolyymia kokevilla yrityksillä. Tällä ilmiöllä on monta mahdollista selitystä, mutta tärkeimpänä mekanismina taustalla näyttäisi olevan se, että vaihtovolyymi sisältää informaatiota, joka ei sisälly täysin yrityksen markkinahintaan.

Tutkielmani koostui 2,805 yksittäisestä ostoilmoituksesta sekä näihin liittyvistä tuotoista Yhdysvalloista vuosilta 2002-2015. Tutkielma keskittyi täysin ostettavaan firmaan; ostavan firman vaikutukset jääköot tulevien tutkimusten aiheiksi. Tutkielmassa määräsin kaikki osakkeet kolmeen eri ryhmään: 1) normaalia pienemmän volyymin, 2) normaalia suuremman volyymin sekä 3) normaalin volyymin osakkeisiin. Jako tapahtui vertaamalla tapahtumaperiodin volyymia referenssiperiodin volyymiin. Tapahtumaperiodi oli 7 päivän pituinen jakso ennen ostoilmoitusta ja referenssiperiodi 40 päivän pituinen jakso ennen ostoilmoitusta. Mikäli tapahtumaperiodin volyymi oli riittävän suuri referenssiperiodin volyymin nähden, valikoitui kyseinen osake normaalia suuremman volyymin osakkeiden ryhmään. Vastaava tehtiin pienen volyymin osakkeille. Käytin useita eri raja-arvoja päättääkseni osakkeen ryhmänmääräytymisen, jotta tulokseni eivät johtuisi pelkästään valitsemistani osakkeista. Vastaavasti tein Welchin kahden otoksen t-testit määrittääkseni tilastollisen merkittävyyden tuloksille. Tuloksista tilastollisesti erittäin merkittäviä olivat erot normaalien ja epänormaalien volyymin osakkeiden epänormaalien tuottojen välillä. Toistin lisäksi yllä olevat laskelmat poistamalla otoksesta mikroyritykset, eli yritykset joiden markkina-arvo oli alle 300 miljoonaa dollaria.

Epänormaalia tuottoa mittasin capital asset pricing –mallin avulla. Laskin sen avulla jokaiselle osakkeelle päivittäisen ”alfan”, eli ylituoton. Niitä hyödyntäen laskin eri osakeryhmille keskimääräisen kumulatiivisen ylituoton vertailuperiodille, joka alkoi päivää ennen ostoilmoitusta ja päättyi 30 päivää ostoilmoituksen jälkeen.

Tutkimustuloksiani voi hyödyntää ottamalla se osaksi osakkeiden volyymien ja niiden sisältämän informaation tulkintaa. Osakkeiden volyymi sisältää paljon informaatiota muun muassa lyhyeksi myynnin rajoitteiden vuoksi; esimerkiksi Diamond and Verrecchia (1987) tutkimuksessaan väittävät, että jaksot jolloin vaihtovolyymi on pientä, antavat viitteitä huonojen uutisten olemassaolosta. Markkinoilla toimii agentteja, joilla on enemmän informaatiota kuin muilla. He eivät kuitenkaan pääse vaihtamaan ja hyötymään tästä informaatiosta lyhyeksi myynnin rajoitteiden vuoksi.

Vaihtovolyymi sisältää erittäin paljon informaatiota erinäisistä yrityksen fundamentaaleista ominaisuuksista ja tulevaisuudennäkymistä; täten yksikään tutkimus ei tähän mennessä ole kyennyt antamaan yksiselitteisiä vastauksia mitä eri volyymin muutokset ja tasot merkitsevät. Omakin tutkimukseni ottaa kantaa vain pieneen

osa-alueeseen tässä viitekehyksessä. Kuitenkin tutkimukseni antaa hyvän lisän jo ennestään tunnettuihin mekanismeihin, jotka vaikuttavat yrityksen vaihtovolyymiin.